

ABSTRACT

A reduced area imaging device is provided for use with a communication device, such as a wireless/cellular phone. In one configuration of the imaging device, the image sensor is placed remote from the remaining image processing circuitry. In a second configuration, all of the image processing circuitry to include the image sensor is placed in a stacked fashion near the same location. In the first configuration, the entire imaging device can be placed at the distal end of a camera module. In a second configuration, the image sensor is remote from the remaining image processing circuitry wherein available space within the phone is used to house the remaining circuitry. In any of the configurations, the image sensor may be placed alone on a first circuit board, or timing and control circuits may be included on the first circuit board containing the image sensor. One or more video processing boards can be stacked in a longitudinal fashion with respect to the first board, or the video processing boards may be placed within the housing of the communication device. The communication device includes a miniature LCD-type monitor which is capable of viewing not only the images taken by the camera module, but also can show incoming video images. The camera module is of such small size that it can be easily stored within the housing of the communication device. In a first embodiment, the camera module communicates with the housing of the communication device by a wired connection. In a second embodiment, the camera module communicates wirelessly with the video telephone. In either embodiment, the camera module may be pointed at any desired object within sight of the user, and without having to actually point or move the phone housing in order to take an image. In the wireless embodiment, a user has total freedom to manipulate the positioning of the camera module without adjusting the position of the video telephone since there is not even a cable to contend with. Any acceptable wireless standard may be used for communication between the camera module and the video telephone. One particularly advantageous standard includes Bluetooth.